MAT730 ASSIGNMENT 1

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Instructions. Please read the instructions on the course website carefully before submitting your solution(s).

Questions.

(1) Let $\sigma \in S_n$ be written as a product of transformations in the following two ways

$$\sigma = \sigma_1\sigma_2 \cdots \sigma_r = \tau_1\tau_2 \cdots \tau_{r'}.$$

Prove that $r \equiv r' \pmod 2$.

(2) Show that the definitions of the sign of a permutation defined using transpositions and inversions give us the same value of the sign.

(3) Ex. 2 from textbook.

(4) Ex. 3(a) from textbook.

Date: 11 August 2025.